

## EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1548	(704/275).CCLS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/01/05 08:10
L2	51	l1 and multimodal	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/01/05 08:10
L3	37	l2 and @ad < "20030711"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/01/05 08:10
L4	1676	(704/270).CCLS.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/01/05 08:10
L5	36	l4 and multimodal	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/01/05 08:10
L6	30	l5 and @ad < "20030711"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/01/05 08:11
L7	50	("5010495" "5386494" "5481645" "5812977" "5884265" "5890123" "5903870" "5909667" "5950167" "5974384" "5991726" "6012030" "6185535" "6233559" "6233560" "6243682" "6246989" "6266641" "6321198" "6424357" "6434526" "6438523" "20020026320" "20020133355" "20020143549").pn.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/01/05 08:12

## EAST Search History

S1	6829	IVR	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/01/03 12:55
S2	3389	S1 and @ad < "20030711"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/01/03 12:55
S3	485	S2 and dialog	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/12/13 10:47
S4	18	S3 and multimodal	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2006/12/13 10:48
S5	308	IVR and workflow	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/01/04 07:32
S6	189	S5 and @ad < "20030711"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/01/03 12:55
S8	52	S6 and peripheral\$1	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/01/03 12:58
S9	0	S8 and multimodal	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/01/03 12:58

## EAST Search History

S10	12	IVR and workflow and multimodal	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/01/04 07:33
S11	11	S10 and @ad < "20030711"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/01/04 07:35
S12	49	multimodal and workflow	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/01/04 07:35
S13	31	S12 and @ad < "20030711"	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/01/04 07:36
S14	96	("20050010418" "20050010892" "6292830" "20060178882" "20060178886" "20060182085" "6708217" "5023953" "6910911" "7052799" "20040003136" "20040059579" "20050095899" "20050272401" "6246983" "5960400" "6026082" "5919141" "20050283532" "5761621" "5854985" "6134453" "6292828" "20020144233" "20030064709" "20030204568" "20050097311" "20040001997" "20040002243" "6031454" "20020087548" "5549104" "5959611" "5240503" "5799297" "5979118" "5832296" "5734910" "5873070" "5885083" "5825308" "5991794" "6061004" "6091832" "6232891" "6259889" "6330539" "6728692" "20060129506" "20050070337" ). pn.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/01/04 10:05
S15	7	S14 and workflow	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/01/04 10:06

## EAST Search History

S16	1	S14 and IVR	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/01/04 10:06
S17	9	S14 and multimodal	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/01/04 10:07
S18	2	S14 and multimodal and workflow	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/01/04 10:07
S19	0	S14 and multimodal and workflow and IVR	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/01/04 10:07
S20	0	S14 and multimodal and IVR	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/01/04 10:07
S21	11	(US-20010049603-\$ or US-20040083479-\$ or US-20030097413-\$ or US-20060178886-\$ or US-20050283532-\$ or US-20030064709-\$ or US-20020144233-\$).did. or (US-7039166-\$ or US-6937705-\$ or US-6636587-\$ or US-6330539-\$). did.	US-PGPUB; USPAT	OR	OFF	2007/01/04 13:58
S22	6	S21 and prompt\$1	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/01/04 14:00

## EAST Search History

S23	0	S21 and prompt\$1 and GUI	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/01/04 14:01
-----	---	---------------------------	---	----	-----	------------------


[Home](#) | [Login](#) | [Logout](#) | [Access Information](#) | [Alerts](#)

Welcome United States Patent and Trademark Office

☐ Search Results

BROWSE

SEARCH

IEEE XPLORE GUIDE

Results for "'((multimodal)&lt;in&gt;metadata)'"

Your search matched 1727 of 1450046 documents.

A maximum of 100 results are displayed, 25 to a page, sorted by Relevance in Descending order.

☒ e-mail

## » Search Options

[View Session History](#)
[New Search](#)

## » Other Resources

(Available For Purchase)

## Top Book Results

[Software-Enabled Control](#)

by Samad, T.; Balas, G.;

Hardcover, Edition: 1

[Thyristor-Based FACTS](#)
[Controllers for Electrical](#)
[Transmission Systems](#)

by Mathur, R. M.; Varma, R. K.;

Hardcover, Edition: 1

[View All 2 Result\(s\)](#)

## » Key

IEEE JNL IEEE Journal or Magazine

IEE JNL IEE Journal or Magazine

IEEE CNF IEEE Conference Proceeding

IEE CNF IEE Conference Proceeding

IEEE STD IEEE Standard

## Modify Search

((multimodal)&lt;in&gt;metadata)

☐ Check to search only within this results set
Display Format: ☒ Citation ☐ Citation & Abstract
[Select All](#) [Deselect All](#)

View: 1-25 | 26-5

- ☐ 1. **User-centered modeling and evaluation of multimodal interfaces**  
 Oviatt, S.;  
[Proceedings of the IEEE](#)  
 Volume 91, Issue 9, Sept. 2003 Page(s):1457 - 1468  
 Digital Object Identifier 10.1109/JPROC.2003.817127  
[AbstractPlus](#) | [References](#) | Full Text: [PDF](#)(930 KB) | Full Text: [HTML](#) IEEE J  
[Rights and Permissions](#)
- ☐ 2. **Calibration of an integrated robotic multimodal range scanner**  
 Yang, C.S.; Curtis, P.; Payeur, P.;  
[Instrumentation and Measurement, IEEE Transactions on](#)  
 Volume 55, Issue 4, Aug. 2006 Page(s):1148 - 1159  
 Digital Object Identifier 10.1109/TIM.2006.876410  
[AbstractPlus](#) | Full Text: [PDF](#)(1072 KB) IEEE JNL  
[Rights and Permissions](#)
- ☐ 3. **Statistical multimodal integration for intelligent HCI**  
 Lizhong Wu; Oviatt, S.L.; Cohen, P.R.;  
[Neural Networks for Signal Processing IX, 1999. Proceedings of the 1999 IEEE](#)  
[Processing Society Workshop](#)  
 23-25 Aug. 1999 Page(s):487 - 496  
 Digital Object Identifier 10.1109/NNSP.1999.788168  
[AbstractPlus](#) | Full Text: [PDF](#)(500 KB) IEEE CNF  
[Rights and Permissions](#)
- ☐ 4. **Multimodal integration-a statistical view**  
 Lizhong Wu; Oviatt, S.L.; Cohen, P.R.;  
[Multimedia, IEEE Transactions on](#)  
 Volume 1, Issue 4, Dec. 1999 Page(s):334 - 341  
 Digital Object Identifier 10.1109/6046.807953  
[AbstractPlus](#) | [References](#) | Full Text: [PDF](#)(140 KB) IEEE JNL  
[Rights and Permissions](#)
- ☐ 5. **Context-based multimodal input understanding in conversational system**  
 Chai, J.; Shimei Pan; Zhou, M.X.; Houck, K.;  
[Multimodal Interfaces, 2002. Proceedings. Fourth IEEE International Conferen](#)  
 14-16 Oct. 2002 Page(s):87 - 92  
 Digital Object Identifier 10.1109/ICMI.2002.1166974

[AbstractPlus](#) | Full Text: [PDF\(333 KB\)](#) IEEE CNF  
[Rights and Permissions](#)

- ☒ **6. MATCH: multimodal access to city help**  
Johnston, M.; Bangalore, S.; Vasireddy, G.;  
[Automatic Speech Recognition and Understanding, 2001. ASRU '01. IEEE Wo](#)  
9-13 Dec. 2001 Page(s):256 - 259  
[AbstractPlus](#) | Full Text: [PDF\(491 KB\)](#) IEEE CNF  
[Rights and Permissions](#)
- ☐ **7. Modeling multimodal integration based on colored Petri nets and feature**  
Huang Bo; Zhang Bing-yi; Zhou Fang; Sun Ya-min;  
[Control, Automation, Robotics and Vision Conference, 2004. ICARCV 2004 8th](#)  
Volume 1, 6-9 Dec. 2004 Page(s):514 - 516 Vol. 1  
Digital Object Identifier 10.1109/ICARCV.2004.1468884  
[AbstractPlus](#) | Full Text: [PDF\(303 KB\)](#) IEEE CNF  
[Rights and Permissions](#)
- ☐ **8. The added value of multimodality in the NESPOLEI speech-to-speech training**  
an experimental study  
Costantini, E.; Pianesi, F.; Burger, S.;  
[Multimodal Interfaces, 2002. Proceedings. Fourth IEEE International Conference](#)  
14-16 Oct. 2002 Page(s):235 - 240  
Digital Object Identifier 10.1109/ICMI.2002.1166999  
[AbstractPlus](#) | Full Text: [PDF\(476 KB\)](#) IEEE CNF  
[Rights and Permissions](#)
- ☐ **9. Designing a robust speech and gaze multimodal system for diverse users**  
Qiaohui Zhang; Go, K.; Imamiya, A.; Xiaoyang Mao;  
[Information Reuse and Integration, 2003. IRI 2003. IEEE International Conference](#)  
2003 Page(s):354 - 361  
Digital Object Identifier 10.1109/IRI.2003.1251437  
[AbstractPlus](#) | Full Text: [PDF\(720 KB\)](#) IEEE CNF  
[Rights and Permissions](#)
- ☒ **10. Context-sensitive help for multimodal dialogue**  
Wright Hastie, H.; Johnston, M.; Ehlen, P.;  
[Multimodal Interfaces, 2002. Proceedings. Fourth IEEE International Conference](#)  
14-16 Oct. 2002 Page(s):93 - 98  
Digital Object Identifier 10.1109/ICMI.2002.1166975  
[AbstractPlus](#) | Full Text: [PDF\(392 KB\)](#) IEEE CNF  
[Rights and Permissions](#)
- ☐ **11. Embarking on multimodal interface design**  
Sinha, A.K.; Landay, J.A.;  
[Multimodal Interfaces, 2002. Proceedings. Fourth IEEE International Conference](#)  
14-16 Oct. 2002 Page(s):355 - 360  
Digital Object Identifier 10.1109/ICMI.2002.1167021  
[AbstractPlus](#) | Full Text: [PDF\(379 KB\)](#) IEEE CNF  
[Rights and Permissions](#)
- ☐ **12. Analysis of the concept of redundancy concerning the design of multimodal**  
combinations of output-elements  
Pirhonen, A.;  
[Computer Human Interaction, 1998. Proceedings. 3rd Asia Pacific](#)  
15-17 July 1998 Page(s):273 - 278  
Digital Object Identifier 10.1109/APCHI.1998.704340  
[AbstractPlus](#) | Full Text: [PDF\(60 KB\)](#) IEEE CNF

[Rights and Permissions](#)

- ☐ **13. A system for medical consultation and education using multimodal human communication**  
Aakay, M.; Marsic, I.; Medl, A.; Guangming Bu;  
[Information Technology in Biomedicine, IEEE Transactions on](#)  
Volume 2, Issue 4, Dec. 1998 Page(s):282 - 291  
Digital Object Identifier 10.1109/4233.737584  
[AbstractPlus](#) | [References](#) | Full Text: [PDF](#)(696 KB) IEEE JNL  
[Rights and Permissions](#)
  
- ☐ **14. Learning Edit Machines for Robust Multimodal Understanding**  
Johnston, M.; Bangalore, S.;  
[Acoustics, Speech and Signal Processing, 2006. ICASSP 2006 Proceedings. ;](#)  
[International Conference on](#)  
Volume 1, 14-19 May 2006 Page(s):I-617 - I-620  
[AbstractPlus](#) | Full Text: [PDF](#)(1608 KB) IEEE CNF  
[Rights and Permissions](#)
  
- ☐ **15. Robust multimodal understanding**  
Bangalore, S.; Johnston, M.;  
[Acoustics, Speech, and Signal Processing, 2004. Proceedings. \(ICASSP '04\).](#)  
[International Conference on](#)  
Volume 1, 17-21 May 2004 Page(s):I - 417-20 vol.1  
Digital Object Identifier 10.1109/ICASSP.2004.1326011  
[AbstractPlus](#) | Full Text: [PDF](#)(2378 KB) IEEE CNF  
[Rights and Permissions](#)
  
- ☐ **16. Multimodal information retrieval, extraction and generation for use in the**  
Wood, C.; Cross, M.; Phuong La;  
[Knowledge-Based Intelligent Electronic Systems, 1998. Proceedings KES '98.](#)  
[International Conference on](#)  
Volume 3, 21-23 April 1998 Page(s):307 - 316 vol.3  
Digital Object Identifier 10.1109/KES.1998.725988  
[AbstractPlus](#) | Full Text: [PDF](#)(1432 KB) IEEE CNF  
[Rights and Permissions](#)
  
- ☐ **17. Neural networks for intelligent multimedia processing**  
Sun-Yuan Kung; Jenq-Neng Hwang;  
[Proceedings of the IEEE](#)  
Volume 86, Issue 6, June 1998 Page(s):1244 - 1272  
Digital Object Identifier 10.1109/5.687838  
[AbstractPlus](#) | [References](#) | Full Text: [PDF](#)(476 KB) IEEE JNL  
[Rights and Permissions](#)
  
- ☐ **18. Comprehensive learning particle swarm optimizer for global optimization functions**  
Liang, J.J.; Qin, A.K.; Suganthan, P.N.; Baskar, S.;  
[Evolutionary Computation, IEEE Transactions on](#)  
Volume 10, Issue 3, June 2006 Page(s):281 - 295  
Digital Object Identifier 10.1109/TEVC.2005.857610  
[AbstractPlus](#) | Full Text: [PDF](#)(1272 KB) IEEE JNL  
[Rights and Permissions](#)
  
- ☐ **19. Multimodal acting in mixed reality interactive storytelling**  
Cavazza, M.; Charles, F.; Mead, S.J.; Martin, O.; Marichal, X.; Nandi, A.;  
[Multimedia, IEEE](#)  
Volume 11, Issue 3, July-Sept. 2004 Page(s):30 - 39  
Digital Object Identifier 10.1109/MMUL.2004.11



[AbstractPlus](#) | [References](#) | Full Text: [PDF\(1648 KB\)](#) IEEE JNL  
[Rights and Permissions](#)

☐ **20. Large-scale evaluation of multimodal biometric authentication using stat systems**

Snelick, R.; Uludag, U.; Mink, A.; Indovina, M.; Jain, A.;  
[Pattern Analysis and Machine Intelligence, IEEE Transactions on](#)  
Volume 27, Issue 3, March 2005 Page(s):450 - 455  
Digital Object Identifier 10.1109/TPAMI.2005.57

[AbstractPlus](#) | [References](#) | Full Text: [PDF\(840 KB\)](#) IEEE JNL  
[Rights and Permissions](#)

☐ **21. Coordinating and prioritizing multimodal transportation projects**

Copperman, R.B.; Devlin, M.P.; Ewalt, R.M.; Lockhart, T.A.; Peterson, K.D.; L  
Tischer, M.L.; Spence, K.P.; Graham, K.A.; Ferguson, W.S.;  
[Systems and Information Engineering Design Symposium, 2004. Proceedings](#)  
16 Apr 2004 Page(s):113 - 119

[AbstractPlus](#) | Full Text: [PDF\(816 KB\)](#) IEEE CNF  
[Rights and Permissions](#)

☐ **22. A speech understanding module for a multimodal mathematical formula**

Hunsinger, J.; Lang, M.;  
[Acoustics, Speech, and Signal Processing, 2000. ICASSP '00. Proceedings. 2](#)  
[International Conference on](#)  
Volume 6, 5-9 June 2000 Page(s):2413 - 2416 vol.4  
Digital Object Identifier 10.1109/ICASSP.2000.859328

[AbstractPlus](#) | Full Text: [PDF\(340 KB\)](#) IEEE CNF  
[Rights and Permissions](#)

☐ **23. Multimodal Presentation Markup Language MPML with emotion expressi attached**

Yuan Zong; Dohi, H.; Ishizuka, M.;  
[Multimedia Software Engineering, 2000. Proceedings. International Symposium](#)  
11-13 Dec. 2000 Page(s):359 - 365  
Digital Object Identifier 10.1109/MMSE.2000.897236

[AbstractPlus](#) | Full Text: [PDF\(492 KB\)](#) IEEE CNF  
[Rights and Permissions](#)

☐ **24. A model for multimodal information retrieval**

Srihari, R.K.; Rao, A.; Han, B.; Munirathnam, S.; Xiaoyun Wu;  
[Multimedia and Expo, 2000. ICME 2000. 2000 IEEE International Conference](#)  
Volume 2, 30 July-2 Aug. 2000 Page(s):701 - 704 vol.2  
Digital Object Identifier 10.1109/ICME.2000.871458

[AbstractPlus](#) | Full Text: [PDF\(328 KB\)](#) IEEE CNF  
[Rights and Permissions](#)

☐ **25. Multimodal tracking and classification of audio-visual features**

Pavlovic, V.;  
[Image Processing, 1998. ICIP 98. Proceedings. 1998 International Conference](#)  
Volume 1, 4-7 Oct. 1998 Page(s):343 - 347 vol.1  
Digital Object Identifier 10.1109/ICIP.1998.723492

[AbstractPlus](#) | Full Text: [PDF\(464 KB\)](#) IEEE CNF  
[Rights and Permissions](#)

View: [1-25](#) | [26-5](#)

[Help](#) [Contact Us](#) [Privacy &](#)




[Subscribe \(Full Service\)](#) [Register \(Limited Service, Free\)](#) [Login](#)

 Search: ☒ The ACM Digital Library ☐ The Guide


**THE ACM DIGITAL LIBRARY**
 [Report a problem](#) [Satisfaction survey](#)

 Term used **multimodal**

 Found **2,849** of **193,448**

Sort results by

Display results



☐ Open results in a new window

[Try an Advanced Search](#)
[Try this search in The ACM Guide](#)

Results 1 - 20 of 200

 Result page: [1](#) [2](#) [3](#) [4](#) [5](#) [6](#) [7](#) [8](#) [9](#) [10](#) [next](#)

Best 200 shown

 Relevance scale ☐ ☐ ☐ ☐ ☐

### 1 [Poster Session 1: From vocal to multimodal dialogue management](#)



Miroslav Melichar, Pavel Cenek

 November 2006 **Proceedings of the 8th international conference on Multimodal interfaces ICMI '06**

Publisher: ACM Press

 Full text available: [pdf\(428.20 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

Multimodal, speech-enabled systems pose different research problems when compared to unimodal, voice-only dialogue systems. One of the important issues is the question of how a multimodal interface should look like in order to make the multimodal interaction natural and smooth, while keeping it manageable from the system perspective. Another central issue concerns algorithms for multimodal dialogue management. This paper presents a solution that relies on adapting an existing unimodal, vocal dia ...

**Keywords:** Wizard of Oz, dialogue management, dialogue systems, graphical user interface (GUI), human computer interaction (HCI), multimodal systems, rapid dialogue prototyping

### 2 [Component-based multimodal dialog interfaces for mobile knowledge creation](#)



Georg Niklfeld, Robert Finan, Michael Pucher

 July 2001 **Proceedings of the workshop on Human Language Technology and Knowledge Management - Volume 2001**

Publisher: Association for Computational Linguistics

 Full text available: [pdf\(55.75 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#)

This paper addresses two related topics: Firstly, it presents building-blocks for flexible multimodal dialog interfaces based on standardized components (VoiceXML, XML) to indicate that thanks to well-supported standardizations, mobile multimodal interfaces to heterogeneous data sources are becoming ready for mass-market deployment, provided that adequate modularization is respected. Secondly, this is put in the perspective of a discussion of knowledge management in firms, and the paper argues t ...

### 3 [Evaluating accessibility: The information-theoretic analysis of unimodal interfaces and their multimodal counterparts](#)



Melanie Baljko

 October 2005 **Proceedings of the 7th international ACM SIGACCESS conference on Computers and accessibility Assets '05**

**Publisher:** ACM Press

Full text available:  pdf(300.86 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

That multimodal interfaces have benefits over unimodal ones has often been asserted. Several such benefits have been described informally, but, to date, few have actually been formalized or quantified. In this paper, the hypothesized benefits of *semantically redundant multimodal input actions* are described formally and are quantified using the formalisms provided by Information Theory. A reinterpretation of Keates and Robinson's empirical data (1998) shows that their criticism of multimod ...

**Keywords:** augmentative and alternative communication (AAC), interface evaluation, interventions for communication disorders, multimodal interfaces, speech generating devices (SGD), voice output communication aids (VOCA)

4 [Tangible interfaces and universal access: The contrastive evaluation of unimodal and multimodal interfaces for voice output communication aids](#)



Melanie Baljko

October 2005 **Proceedings of the 7th international conference on Multimodal interfaces ICMi '05**

**Publisher:** ACM Press

Full text available:  pdf(286.39 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

For computational Augmentative and Alternative Communication (AAC) aids, it has often been asserted that multimodal interfaces have benefits over unimodal ones. Several such benefits have been described informally, but, to date, few have actually been formalized or quantified. In this paper, some of the special considerations of this application domain are described. Next, the hypothesized benefits of *semantically nonredundant multimodal input actions* over unimodal input actions are descr ...

**Keywords:** augmentative and alternative communication (AAC), interventions for communication disorders, multimodal interfaces, speech generating devices (SGD), voice output communication aids (VOCA)

5 [Posters: A user interface framework for multimodal VR interactions](#)



Marc Erich Latoschik

October 2005 **Proceedings of the 7th international conference on Multimodal interfaces ICMi '05**

**Publisher:** ACM Press

Full text available:  pdf(507.59 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

This article presents a User Interface (UI) framework for multimodal interactions targeted at immersive virtual environments. Its configurable input and gesture processing components provide an advanced behavior graph capable of routing continuous data streams asynchronously. The framework introduces a Knowledge Representation Layer which augments objects of the simulated environment with Semantic Entities as a central object model that bridges and interfaces Virtual Reality (VR) and Artificial ...



**Keywords:** gesture and speech processing, multimodal interaction, semantic scene description, user interface framework, virtual reality

6 [A model for multimodal reference resolution](#)

Luis Pineda, Gabriela Garza

June 2000 **Computational Linguistics**, Volume 26 Issue 2

**Publisher:** MIT Press


Full text available:  pdf(3.60 MB)  Additional Information: [full citation](#), [abstract](#), [references](#)  
[Publisher Site](#)

An important aspect of the interpretation of multimodal messages is the ability to identify when the same object in the world is the referent of symbols in different modalities. To understand the caption of a picture, for instance, one needs to identify the graphical symbols that are referred to by names and pronouns in the natural language text. One way to think of this problem is in terms of the notion of anaphora; however, unlike linguistic anaphoric inference, in which antecedents for pronoun ...

7 Posters: Modeling multimodal integration patterns and performance in seniors: toward adaptive processing of individual differences

 Benfang Xiao, Rebecca Lunsford, Rachel Coulston, Matt Wesson, Sharon Oviatt  
 November 2003 **Proceedings of the 5th international conference on Multimodal interfaces**

**Publisher:** ACM Press

Full text available:  pdf(336.43 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Multimodal interfaces are designed with a focus on flexibility, although very few currently are capable of adapting to major sources of user, task, or environmental variation. The development of adaptive multimodal processing techniques will require empirical guidance from quantitative modeling on key aspects of individual differences, especially as users engage in different types of tasks in different usage contexts. In the present study, data were collected from fifteen 66- to 86-year-old heal ...

**Keywords:** human performance errors, multimodal integration, self-regulatory language, senior users, speech and pen input, task difficulty

8 User tests and multimodal gesture: Capturing user tests in a multimodal, multidevice informal prototyping tool

 Anoop K. Sinha, James A. Landay  
 November 2003 **Proceedings of the 5th international conference on Multimodal interfaces**


**Publisher:** ACM Press

Full text available:  pdf(413.56 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#), [review](#)

Interaction designers are increasingly faced with the challenge of creating interfaces that incorporate multiple input modalities, such as pen and speech, and span multiple devices. Few early stage prototyping tools allow non-programmers to prototype these interfaces. Here we describe CrossWeaver, a tool for informally prototyping multimodal, multidevice user interfaces. This tool embodies the informal prototyping paradigm, leaving design representations in an informal, sketched form, and create ...

**Keywords:** informal prototyping, mobile interface design, multidevice, multimodal, pen and speech input, sketching

9 Attention and integration: Toward a theory of organized multimodal integration patterns during human-computer interaction

 Sharon Oviatt, Rachel Coulston, Stefanie Tomko, Benfang Xiao, Rebecca Lunsford, Matt Wesson, Lesley Carmichael  
 November 2003 **Proceedings of the 5th international conference on Multimodal interfaces**

**Publisher:** ACM Press

Full text available:  [pdf\(286.21 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

As a new generation of multimodal systems begins to emerge, one dominant theme will be the integration and synchronization requirements for combining modalities into robust whole systems. In the present research, quantitative modeling is presented on the organization of users' speech and pen multimodal integration patterns. In particular, the potential malleability of users' multimodal integration patterns is explored, as well as variation in these patterns during system error handling and tasks ...

**Keywords:** Gestalt theory, co-timing, entrenchment, error handling, multimodal integration, speech and pen input, task difficulty


10 Joint session with UIST: Mutual disambiguation of 3D multimodal interaction in augmented and virtual reality



Ed Kaiser, Alex Olwal, David McGee, Hrvoje Benko, Andrea Corradini, Xiaoguang Li, Phil Cohen, Steven Feiner

November 2003 **Proceedings of the 5th international conference on Multimodal interfaces**

**Publisher:** ACM Press

Full text available:  [pdf\(369.73 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

We describe an approach to 3D multimodal interaction in immersive augmented and virtual reality environments that accounts for the uncertain nature of the information sources. The resulting multimodal system fuses symbolic and statistical information from a set of 3D gesture, spoken language, and referential agents. The referential agents employ visible or invisible volumes that can be attached to 3D trackers in the environment, and which use a time-stamped history of the objects that intersect ...

**Keywords:** augmented/virtual reality, evaluation, multimodal interaction


11 Interacting through different modalities: Visual display, pointing, and natural language: the power of multimodal interaction



Antonella De Angeli, Walter Gerbino, Giulia Cassano, Daniela Petrelli

May 1998 **Proceedings of the working conference on Advanced visual interfaces**

**Publisher:** ACM Press

Full text available:  [pdf\(1.56 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#)

This paper examines user behavior during multimodal human-computer interaction (HCI). It discusses how pointing, natural language, and graphical layout should be integrated to enhance the usability of multimodal systems. Two experiments were run to study simulated systems capable of understanding written natural language and mouse-supported pointing gestures. Results allowed to: (a) develop a taxonomy of communication acts aimed at identifying targets; (b) determine the conditions under which sp ...

**Keywords:** cross-modal integration, referent identification strategies

12 Commerce and Businesses: A voice and ink XML multimodal architecture for mobile e-commerce systems



Zouheir Trabelsi, Sung-Hyuk Cha, Darshan Desai, Charles Tappert

September 2002 **Proceedings of the 2nd international workshop on Mobile commerce**

**Publisher:** ACM Press

Full text available:  [pdf\(445.55 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

This paper presents a multimodal interface architecture that combines standardized voice and ink formats to facilitate the creation of robust and efficient multimodal mobile e-Commerce systems, particularly for noisy mobile environments. The platform provides a Web interactive system for generic multimodal application development. By providing mutual disambiguation of input signals and superior error handling this architecture should broaden the spectrum of users to the general population, inclu ...

**Keywords:** InkXML, VoiceXML, handwriting recognition, multimodal applications, mutual disambiguation, speech recognition


### 13 [Multimodal error correction for speech user interfaces](#)



Bernhard Suhm, Brad Myers, Alex Waibel

March 2001 **ACM Transactions on Computer-Human Interaction (TOCHI)**, Volume 8 Issue 1

**Publisher:** ACM Press

Full text available:  [pdf\(244.34 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Although commercial dictation systems and speech-enabled telephone voice user interfaces have become readily available, speech recognition errors remain a serious problem in the design and implementation of speech user interfaces. Previous work hypothesized that switching modality could speed up interactive correction of recognition errors. This article presents multimodal error correction methods that allow the user to correct recognition errors efficiently without keyboard input. Correcti ...

**Keywords:** dictation systems, interactive error correction, multimodal interfaces, pen input, performance model, speech input, speech user interfaces

### 14 [Multimodal system processing in mobile environments](#)



Sharon Oviatt

November 2000 **Proceedings of the 13th annual ACM symposium on User interface software and technology**

**Publisher:** ACM Press

Full text available:  [pdf\(579.32 KB\)](#) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

**Keywords:** mobile interface design, multimodal architecture, mutual disambiguation, recognition errors, robust performance, speech and pen input

### 15 [Taming recognition errors with a multimodal interface](#)



Sharon Oviatt

September 2000 **Communications of the ACM**, Volume 43 Issue 9

**Publisher:** ACM Press

Full text available:  [pdf\(493.57 KB\)](#) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#),  
 [html\(35.95 KB\)](#) [review](#)

### 16 [Perceptual user interfaces: multimodal interfaces that process what comes naturally](#)



Sharon Oviatt, Philip Cohen

March 2000 **Communications of the ACM**, Volume 43 Issue 3

**Publisher:** ACM Press

Full text available:  [pdf\(256.26 KB\)](#)  
 [html\(38.29 KB\)](#)

Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)



## 17 Ten myths of multimodal interaction



Sharon Oviatt

November 1999 **Communications of the ACM**, Volume 42 Issue 11

**Publisher:** ACM Press

Full text available:  [pdf\(567.63 KB\)](#)  
 [html\(37.89 KB\)](#)

Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#),  
[review](#)

## 18 Model-based and empirical evaluation of multimodal interactive error correction



Bernhard Suhm, Brad Myers, Alex Waibel

May 1999 **Proceedings of the SIGCHI conference on Human factors in computing systems: the CHI is the limit**

**Publisher:** ACM Press

Full text available:  [pdf\(1.07 MB\)](#)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Our research addresses the problem of error correction in speech user interfaces. Previous work hypothesized that switching modality could speed up interactive correction of recognition errors (so-called multimodal error correction). We present a user study that compares, on a dictation task, multimodal error correction with conventional interactive correction, such as speaking again, choosing from a list, and keyboard input. Results show that multimodal correction is faster than conventional ...

**Keywords:** interactive error correction, multimodal interaction, quantitative performance model, speech and pen input, speech user interfaces

## 19 QuickSet: multimodal interaction for distributed applications



Philip R. Cohen, Michael Johnston, David McGee, Sharon Oviatt, Jay Pittman, Ira Smith, Liang Chen, Josh Clow

November 1997 **Proceedings of the fifth ACM international conference on Multimedia**

**Publisher:** ACM Press

Full text available:  [pdf\(1.65 MB\)](#)

Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

**Keywords:** agent architecture, distributed interactive simulation, gesture recognition, multimodal interfaces, natural language processing, speech recognition


## 20 Integration and synchronization of input modes during multimodal human-computer interaction



Sharon Oviatt, Antonella DeAngeli, Karen Kuhn

March 1997 **Proceedings of the SIGCHI conference on Human factors in computing systems**

**Publisher:** ACM Press

Full text available:  [pdf\(1.18 MB\)](#)

Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)



**Keywords:** dynamic interactive maps, integration and synchronization, multimodal interaction, predictive modeling, spatial location information, speech and pen input

Results 1 - 20 of 200

Result page: [1](#) [2](#) [3](#) [4](#) [5](#) [6](#) [7](#) [8](#) [9](#) [10](#) [next](#)

The ACM Portal is published by the Association for Computing Machinery. Copyright © 2007 ACM, Inc.

[Terms of Usage](#) [Privacy Policy](#) [Code of Ethics](#) [Contact Us](#)

Useful downloads:  [Adobe Acrobat](#)  [QuickTime](#)  [Windows Media Player](#)  [Real Player](#)

**Wang, Philip R.**

---

**From:** Dorvil, Richmond  
**Sent:** Wednesday, December 06, 2006 11:14 AM  
**To:** Zhen, Wei  
**Cc:** Wang, Philip R.  
**Subject:** RE: 10/617422 -- help with transfer

Not suitable for 704 or 704/255. Claims 1 is dealing with interaction between software applications, there is no processing of signal. I believe claim 1 should be classified somewhere in 717 or 703/23. Claim 3 recites that the peripheral devices include speech synthesizer or speech recognition but they are just that peripheral devices and is insufficient to make it a subject matter for class 704, the same way claim 4 recites a screen does not make it the subject matter for class 345. If I missed something, let me know or send the examiner over to see one of the primaries or myself. Thanks --

*Rich Dorvil*  
*SPE, Speech Division 2626*  
*(571)-272-7602*

-----Original Message-----

**From:** Zhen, Wei  
**Sent:** Wednesday, December 06, 2006 9:34 AM  
**To:** Zhen, Wei; Dorvil, Richmond  
**Cc:** Wang, Philip R.  
**Subject:** RE: 10/617422 -- help with transfer

Richmond,

Do you have an update on this? Thanks for your help.

Wei Zhen

-----Original Message-----

**From:** Zhen, Wei  
**Sent:** Tuesday, November 14, 2006 4:35 PM  
**To:** Dorvil, Richmond  
**Subject:** FW: 10/617422 -- help with transfer

Richmond,

Could you please reconsider this case for restriction requirement? Claims 23-33 will be classified under 717, Could 1-22 and 34 be classified in 704/255 (this is very similar to 10/617,593 which is currently under your docket)? Thank you for your help.

Wei Zhen  
SPE 2191

-----Original Message-----

**From:** Steelman, Mary  
**Sent:** Tuesday, November 14, 2006 4:28 PM  
**To:** Zhen, Wei  
**Subject:** RE: 10/617422 -- help with transfer

This case is very similar to 10 617593 which is docketed to 2626 704/255.

Claim 23-33 are directed towards "developing...applications...", but 1-22 & 34 are for executing speech processing.

Seems like same examiner should do them all, and restrict the "developing...application claims"

Both applications have a PCT related to them.

Mary